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PROVISIONAL INTELLIGENCE REPORT

THE MACHINE TOOL INDUSTRY IN EAST GERMANY



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THE MACHINE TOOL INDUSTRY IN EAST GERMANY

CIA/RR PR-87

(ORR Project 34.230)

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THE MACHINE TOOL INDUSTRY IN EAST GERMANY*

Summary

The machine tool industry in East Germany has recovered a large part of its wartime potential despite World War II damage and postwar removal of equipment by the USSR and Poland. Production of machine tools for 1954 is estimated at 28,000 units, and although this output falls short of the 1941 peak of 41,000 units, the machines now produced are heavier, more complex, and more efficient. The industry is presently operating at near capacity and produces nearly a full range of high-quality machine tools.

A peak production of 35,000 units is probable by 1958, when tonnage and value of output will have exceeded that of the prewar period. Only a small expansion of existing facilities is expected after 1954.

In addition to meeting domestic requirements, the machine tool industry exports, on a value basis, more than 25 percent of its current production. The Soviet Bloc receives by far the major share of these exports, although the East Germans are attempting to sell in Western markets. This attempt to capture Western markets will receive increased emphasis in the future.

The machine tool industry has received a high priority in East German planning. The industry is well integrated and is capable of adapting itself to changing demands. Present indications are that the East German machine tool industry is performing a typical peacetime role of supplying both East German and Soviet Bloc industry.

I. Introduction.

A. Definition.

The machine tool industry of East Germany produces nonportable, motor-driven, metal-cutting machines. 1/** The industry is referred to as

* The estimates and conclusions contained in this report represent the best judgment of the responsible analyst as of 1 October 1954.

** References in arabic numerals are to sources listed in Appendix D.

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the producer of machines which "reproduce themselves". The machine tools covered in this report include planers and slotters, engine lathes, turret lathes and automatics, drill presses and horizontal boring machines, milling machines, grinders and polishers, gear-cutting machines, and combined heavy and special types of machine tools. The German word for machine tool -- "Werkzeugmaschinen" -- identifies the types of machine tools covered in this report. Shearing and pressing machines (metal-forming rather than metal-cutting operations despite the cutting involved in shearing) are not included.

B. History.

The German machine tool industry before World War II had a period of about 5 years to equip factories with new machines and compete in the world market. Production exceeded that of the excellent US industry. 2/ In the prewar period the eastern regions of Germany did not produce a full range of machine tool types comparable to the western regions. The eastern regions especially lagged in the production of heavy and specialized types. 3/ In this prewar period, Germany's machine tool industry was characterized by a large number of producing units, slightly over 3 percent, employing over 80 percent of the workers. The industry was centered in Cologne-Duesseldorf, Stuttgart-Reutlingen, and the Chemnitz* - Dresden-Leipzig area. The product was mainly universal types of tools and was strongly oriented toward the external market. In fact, as high as 88 percent of German production was exported in one early period in the 1930's. During this early period of the 1930's the USSR was Germany's major buyer of machine tools. The capacity of Germany's machine tool industry exceeded actual shipments throughout the prewar period and even into the early part of World War II. 4/

The separation of East Germany from the rest of Germany after World War II gave the Soviet Bloc about one-third of Germany's well-integrated and highly productive industry. 5/ Soviet confiscations depleted the inventory and in many cases absorbed whole plants. 6/ In 1946 and 1947, however, the Russians reversed the earlier policy of destroying this essential industry and gave it a high priority. Approximately 50 percent of investment in East German industry in 1946 was allocated to putting the machine tool industry back in operation. 7/ After this reversal of Soviet policy, the industry began to recover and by 1949 had made great strides. However, following the cessation of interzonal trade in 1948, the industry was again hampered by its

* Now named Karl-Marx-Stadt.

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inability to produce a full range of types. During this period, East German industry undertook additional technological research and attacked the problem of producing all types of machine tools.

During its early recovery, the industry was influenced by three factors. First, the corporations established by the USSR (Sowjetische Aktiengesellschaften -- SAG) entered the field. They were concerned mainly with heavy construction and items not strictly within the scope of the machine tool industry. Through their design bureaus and some limited production the SAG organizations, however, did exercise some control over the East German machine tool industry. Second, the public East German firms began to recover, and additional scores of plants were nationalized. Third, the private plants were still operating, though at a decreasing rate as the result of the expanded 8/ nationalization program. Finally, because of a gradually worsening material allocation problem the machine tool industry was placed under the control of the "publicly owned" East German corporation, VVB-WMW (Werkzeugmaschinen und Werkzeug - Machine Tools and Tools). The SAG's continued their production and the few private plants (called Treuhand Betriebe - "firms held in trust") continued to operate on a limited nonpriority basis. Despite the many organizational changes, the WMW continued until 1954 to exercise general control over the production of machine tools. 9/

The VVB's were eliminated as control or administrative groups at the end of 1953, although a government decree stated that the initials could be used as a trade-mark to identify the industry's manufactured products. 10/

C. Technology.

1. Technical Capabilities.

Historically, Germany has had a reputation for high-quality machine tool production. East Germany's machine tool industry has a generally modern technological level. 11/ East German industry, however, is not as capable as its western counterpart because of (1) the loss of many top-flight technical and managerial personnel to the West following World War II, (2) the position of West Germany as a competitor in the world market as opposed to East Germany's position in a noncompetitive market and a consequent lack of initiative in the industry, and (3) the greater prewar experience of the West Germans.

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Although technically advanced, East Germany's machine tool industry does not equal in all areas the machine tool industry of the USSR in either quantity of production or technical capabilities. 12/ East Germany is, however, able to contribute to the Soviet technological development of certain types of milling machines and lathes. Technical design bureaus have been integrated with the East German machine tool industry. Design bureaus are also connected with the SAG organizations. 13/

In many cases East German machines appear to be underpowered. On one particular milling machine US practice would dictate that there be 3 motors for each of the important movements; the East Germans use 1 motor. Automatic features are lacking in many machines. US and Soviet practice are ahead in this particular design, though the East Germans have begun to adopt automatic operations in their design. In certain cases the East German machines appear to have slightly slower cutting speeds. In addition, the East German machines do not have the "eye appeal" of Western machines. While this is not specifically a measure of technological competence, it is indicative of the noncompetitive market confronting the East German industry. The machine lines are "boxy." Pulleys and chains are sometimes exposed where US practice would dictate a housing or covering, and colors have only recently been introduced in an effort to bring out the lines and to identify controls and certain operational features. US technicians are quick to emphasize that these "eye-appeal" features do not influence machine capabilities. In fact, these features can add many man-hours to production and repair schedules. 14/

2. Substitutes.

Machine tools as a class can be considered as being nonsubstitutable. It is possible for one machine tool to be used, however, in an operation which is considered the normal function of another type. For example, the generation of a high-lead thread is performed normally on a milling machine, although a lathe can be used to perform the same operation. Another example is drilling holes with a lathe instead of a drill press. These techniques most often call for highly skilled operators. In addition, mass production techniques call for the substitution of forging and casting procedures to rather close limits to eliminate the rough turning and rough milling on certain pieces.

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3. Convertibility.

Conversion, or the transfer of existing production facilities from another industry to the machine tool industry, is a possible method of increasing machine tool capacity in the event of a sudden increase in demand. For example, a certain amount of machine tool production in East Germany is already being performed in plants whose main products are classified under another industry. It is a relatively simple task to convert such facilities completely to machine tool production because of the availability of desired types of machines and equipment and the possession of the necessary industrial know-how. East Germany has a large general machine building industry which could be converted to machine tool production. The ease and degree of convertibility is dependent upon the relative emphasis placed upon machine tool production. Converting large sectors of another industry to machine tool production could, however, create shortages in other strategic sectors of the East German economy.

In the same manner, war demands might place strong pressure upon the machine tool industry to convert some of its facilities to armament production. In effect, the machine tool industry is of high strategic importance in war planning. Not only does the industry have an intrinsic value due to the prime importance of machine tools in industrial production, but it also possesses a high degree of flexibility that can be used to bolster other sectors of the industrial economy.

D. Administrative Organization.

The machine tool industry of East Germany is administered through the organizational structure pictured in the accompanying chart.* This organization was established through a decree effective on 1 January 1954. Certain lines of authority are still being revised and clarified, but essentially the control will be directed through the depicted channels.

The reorganization was designed to centralize control and to reduce the bureaucratic structure. The present organization of the machine tool industry, however, still shows a complex, unwieldy organizational structure with additional control channels at the top echelons, although greater responsibility (and thus less direct control) now exists in the lower echelons.

* Following p. 6.

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The office of the Ministry of Machine Construction is the center of power in the industry. This office carries out the decisions of the State Planning Commission which are approved in the Council of Ministers. Other organizational offices both above and below the Ministry of Machine Construction have administrative functions, but basically machine production is guided through policy decisions and machine tool requirements set forth by the State Planning Commission.

A certain degree of independent action by the plants is to be permitted under the new organization. The individual plants, called VEB's (Volkseigene Betriebe -- People's-Owned Enterprise) will contract for deliveries of raw materials and sales of their products under a "license" from the appropriate external and internal trade ministry. It is doubtful, in the face of the planned goals and the strong position of the Ministry, that this plant-level action will ever go too far. However, if control is actually relaxed to permit some local initiative, it will be an indication of the Communist Party's belief that the lower echelon leaders are now politically reliable. 15/

The most important personality in the machine tool industry is Heinrich Rau, Minister of Machine Construction. Former Head of the State Planning Commission, he is an intelligent leader with great power in the SED (Sozialistische Einheitspartei Deutschlands - Communist Party of East Germany). Heinrich Rau and Fritz Selbmann, Minister of Heavy Industry (coal and power production) are the two top economic leaders of the State. Gerhard Ziller, Rau's predecessor, has now returned to his political activities and is the new Secretary of the Central Committee of the SED. Rau's Deputy Minister is Ernst Scholz. Scholz served with Rau on the State Planning Commission as his Deputy. Officials at the Main Administration level have not been announced as yet, but it is anticipated that many if not all of the former officials will retain their posts. The organizational change was definitely not caused by personality clashes. 16/

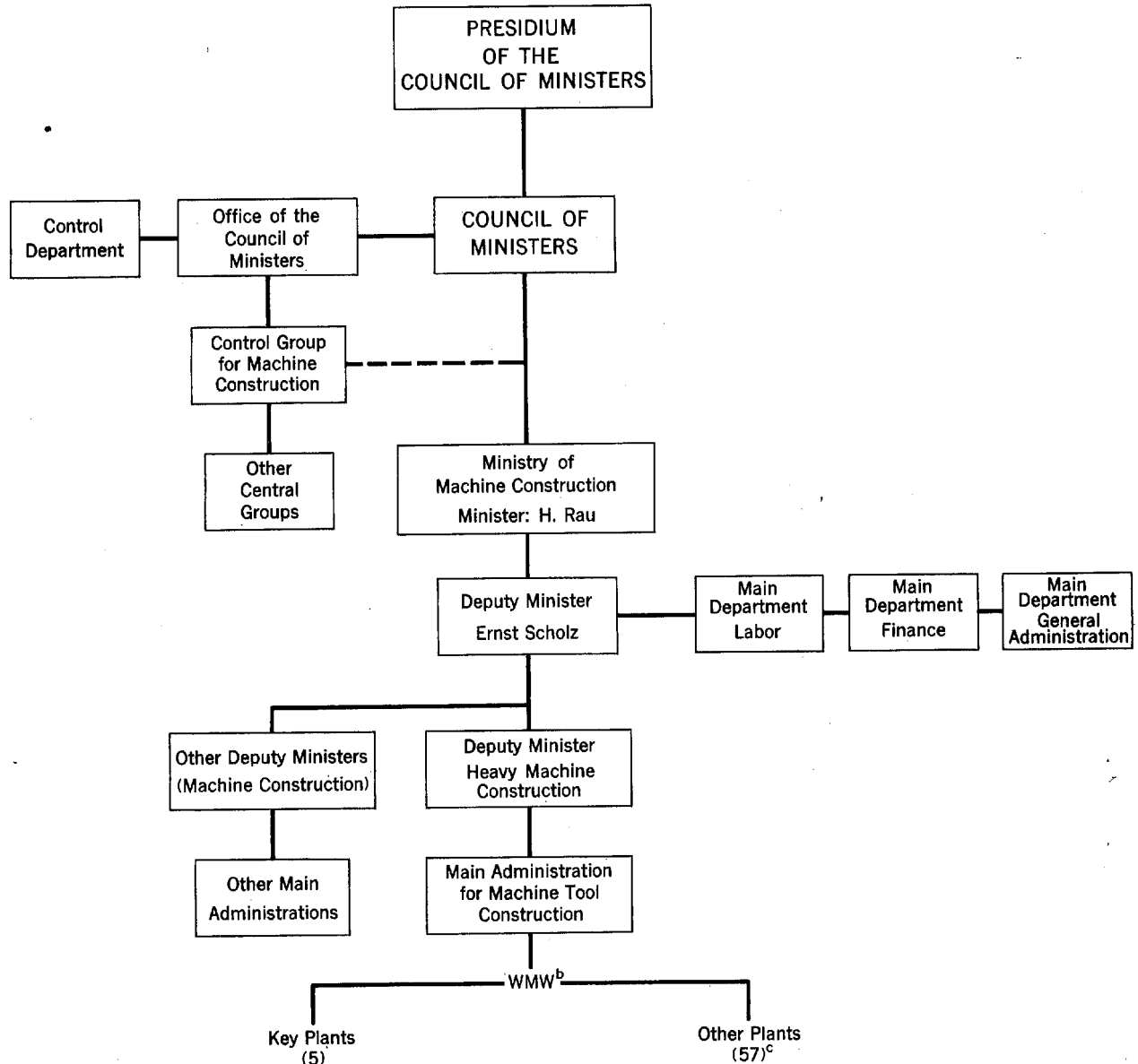
This latest reorganization is one in a series of changes which have taken place almost regularly in the East German industrial ministries since the establishment of the German government. Each reorganization has been designed to eliminate a specific set of evils and each change has bred new problems. Furthermore, each change has followed a somewhat earlier but similar Soviet reorganization, another indicator of the Soviet hand in East German affairs.

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EAST GERMANY
ORGANIZATION OF THE MACHINE TOOL INDUSTRY^a
MARCH 1954



^a The Ministry of Machine Construction is shown directly subordinate to the Council of Ministers. For purposes of clarity this chart does not include the other Ministries which are also subordinate to the Council of Ministers.

^b Werkzeugmaschinen- und Werkzeug (Machine Tools and Tools). Symbol of the East German Machine Tool Industry.

^c Includes units which have partial responsibility to other main administrations. Also private firms.

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II. Supply.

A. Production.

The estimates given in Table 1* cover (1) the prewar period (1939-44), (2) the postwar period (1946-50), (3) the Plan years (1951-55), and (4) the post-Plan period. The production of machine tools reflects the economic and political conditions prevailing in Germany during the various periods.

The prewar period was characterized by a high level of universal type production. The immediate postwar period was one of reconstruction, greatly reduced production, and relatively low quality products. The Five Year Plan which started in 1951 has shown higher production rates and increased quality. The trend has been towards increasing the production of automatic types. The post-Plan period will probably deemphasize the production of the simple types and increase the production of the more specialized automatic types.

As a result of technological improvements and changed use-patterns, East Germany's machine tool production will not equal in any foreseeable period the production (in units) of the prewar period. The peak unit production occurred in 1941 and the probable postwar peak will occur in 1958. Although unit production of machine tools will continue at less than the prewar peak, value and tonnage figures will probably be higher in 1958 than in 1941. Machine tools have been increasing rapidly in size and cost since World War II, and the increased work capacity of the machines has tended to exceed that of the early machines through the use of higher speeds, multiple tooling (including use of carbide tools), and automatic features.

B. Imports.

Imports of machine tools have not been of significant proportions since 1950. During the early postwar period when East German industry was attempting to restore industrial production, the picture was much different. Limited information exists on East German imports, both in the early prewar period and through the Plan period, although it is believed that after 1950, imports were less than 100 units a year. In the estimate of the East German inventory of machine tools (see p. 10) imports have been kept at an estimated 100 units a year for the period of 1951-53. 17/

* Table 1 follows on p. 8.

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Table 1
Estimated Production of Machine Tools in East Germany
1939-58 a/

Machine Types	Units																			
	1939	1940	1941	1942	1943	1944 b/	1945	1946	1947	1948	1949	1950 e/	1951 d/	1952	1953	1954	1955	1956	1957	1958 e/
Planers and Slotters	1,900	1,900	1,600	1,250	1,220	800	N.A.	340	490	610	700	1,300	1,500	1,900	2,100	2,200	2,400	2,600	2,700	2,800
Engine Lathes	9,010	10,000	10,200	9,080	7,200	5,760	N.A.	900	1,300	1,600	1,800	3,300	4,000	5,000	5,500	5,800	6,300	6,700	7,200	7,300
Turret Lathes	3,120	3,560	3,630	3,370	2,900	1,850	N.A.	50	70	90	110	190	220	280	310	340	360	380	410	420
Hand Automatics																				
Drill Press and Horizontal Boring Mill	10,400	10,700	11,100	8,410	7,920	6,600	N.A.	1,000	1,400	1,800	2,100	3,800	4,500	5,700	6,200	6,700	7,100	7,600	8,200	8,300
Grinding Machines	3,950	4,860	4,530	4,070	3,170	2,300	N.A.	500	700	830	1,000	1,900	2,200	2,800	3,000	3,200	3,500	3,700	4,000	4,100
Shrinders and Polishers	8,970	8,540	8,950	7,720	6,750	4,940	N.A.	1,400	2,000	2,450	2,800	5,200	6,100	7,700	8,500	9,000	9,700	10,000	11,000	11,000
Shrink-Cutting Machines	600	730	700	760	660	560	N.A.	50	70	80	100	180	200	260	290	310	300	350	380	380
Combined, Heavy and Special Machines	10	20	20	20	30	600	N.A.	50	70	80	100	180	200	260	290	310	300	350	380	380
Total	38,000	40,300	40,700	34,700	29,800	23,400		4,300	6,100	7,600	8,700	16,000	19,000	24,000	26,000	28,000	30,000	32,000	34,000	35,000

a. See Appendix B, Methodology.

b. Estimated margin of error 1939-44: ± 5 percent.

c. Estimated margin of error 1946-50: ± 10 percent.

d. Estimated margin of error 1951: ± 5 percent.

e. Estimated margin of error 1952-58: ± 20 percent.

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In the prewar and immediate postwar periods, the western sections of Germany supplied a major share of the eastern section's requirements in the heavy and special-purpose machine tool categories. 18/ The almost complete cessation of interzonal trade since 1948 has forced East Germany to rely on domestic production and other producers in the Soviet Bloc. There is evidence that the stoppage of trade between the partitioned areas of Germany was a serious blow to the East German economy, although it further increased the high-priority position of the machine tool industry. 19/

Although East Germany is nearly self-sufficient in machine tool production, limited shipments of specialized machines are being received from the USSR, Poland, Czechoslovakia, and Switzerland. Imported machines from the USSR and Switzerland have, in each case, embodied advanced high-precision and automatic features. In addition, certain machines are imported which are not a part of the East German manufacturing program and the production of which would be uneconomical. 20/ A good example of the latter is East Germany's continued reliance on Poland for certain heavy machines used in the manufacture of equipment for railroads (for example, wheel and axle lathes). 21/ The USSR appears reluctant to export machine tools to East Germany, although some shipments have been made on a very limited basis. The return of the SAG organizations to East German control has made available to the East German economy a quantity of machine tools equivalent to major imports. 22/

C. Inventory.

The inventory estimates are the result of deducting known losses of machine tools from East Germany's World War II holdings. These losses included war damage and Polish and Russian removals. Annual estimated production, exports, imports, reparations, and retirements have been combined to give the yearly inventory estimates. The estimated inventory of machine tools in East Germany is given in Table 2.*

D. Stockpiling.

East Germany appears to have a program for the stockpiling of strategic materials and equipment. 23/ However, little is known of the East German part of the over-all Soviet Bloc endeavor to plan strategic stockpiles. 24/

* Table 2 follows on p. 10.

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Table 2
Estimated Inventory of Machine Tools in East Germany
1945-53

Year	Production a/	Imports b/	Exports c/	Reparations d/	Retirement d/	Total Inventory
1945	N.A.	N.A.	0	0	0	305,000 e/
1946	4,300	N.A.	0	N.A.	3,000	306,000
1947	6,100	N.A.	0	N.A.	3,000	309,000
1948	7,600	N.A.	Negligible	N.A.	6,000	311,000
1949	8,700	N.A.	Negligible	N.A.	6,000	314,000
1950	16,000	N.A.	1,000	N.A.	9,000	320,000
1951	19,000	100	3,500	252	10,000	325,000
1952	24,000	100	5,000	110	13,000	331,000
1953	26,000	100	6,500	126	13,000	338,000

a. See Part II, A, Production, p. 7.

b. See Part II, B, Imports, p. 7.

c. See Part III, B, Exports, p. 11.

d. See Appendix B, Methodology, p. 26.

e. The 1954 machine tool inventory was estimated by subtracting known losses of machine tools from the World War II inventory (680,000 units) of East Germany. Losses included war damages (45,000 units), Soviet removals (240,000 units), and Polish removals (90,000). Polish removals are those machine tools located in the eastern territories and transferred to Poland following World War II. Soviet removals actually took place in three stages: (1) 1945, (2) spring of 1946, and (3) winter of 1946-47.

Machine tools listed under imports and reparations are not indicated arithmetically under the total inventory figures because of the rounding of these totals. Reparations to the USSR have included specialized types making the reparation shipments considerably more important than the number of units would indicate. Imports have included specialized types of machine tools not produced in East Germany.

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Nothing indicates that machine tools are being stockpiled in East Germany under the concept of "strategic stockpiling." In 1951 a few machine tools were allocated to a category known as Plan Reserves but this is believed to represent a normal stockpiling equivalent to a temporary undistributed stock.

The US Defense Department has a plan which includes a program for holding government-owned machine tools in US industrial plants to provide a broad mobilization base. 25/ In this program the plants would use them only in the event that a sudden increase in products was needed to fill government orders (in the event of war) and the plant would be paid to store them until that time. No similar plan apparently exists in East Germany.

III. Demand.

A. Use Pattern.

The allocation of the East German machine tool production in 1951, a representative year, is given in Table 3.*

B. Exports.

Immediately following World War II, East Germany's industry was in no condition to export machine tools. Removals and dismantlings had destroyed a large share of available machine tool capacity and exports were not possible until about 1949.

Reparations, or forced exports, constituted the main share of East Germany's shipments until 1951. Actual shipments in the 1949-51 period were small, with the largest number of machines going to the SAG's in East Germany, the GSOW (Soviet military units in Eastern Germany), and directly to the USSR and Poland. The direct shipments to the USSR and Poland have been quite small in comparison to total production. 26/

Since 1951, East Germany has recovered some of the prewar German export markets in Eastern Europe and the Far East and is shipping machine tools to all members of the Bloc.

East German exports of machine tools have increased from a negligible amount in 1946 to approximately 25 percent of current production.

* Table 3 follows on p. 12.

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Table 3

Allocation of Machine Tools in East Germany
1951 a/* 27/

Receiver	Number of Machines (Units)	Percent
Soviet Units in Germany	50	0.4
Reparations (Directly to the USSR)	166	1.4
Exports (Under Trade Pacts)	2,967	24.5
Plan Reserve	12	0.1
Land Mecklenburg (Locally Controlled Industry)	171	1.4
Land Brandenburg (Locally Controlled Industry)	221	1.8
Land Sachsen (Locally Controlled Industry)	427	3.5
Land Sachsen-Anhalt (Locally Controlled Industry)	139	1.1
Land Thueringen (Locally Controlled Industry)	432	3.6
City of Berlin (Locally Controlled Industry)	234	1.9
SAG's (Soviet Corporations in Germany)	2,491	20.5
Central Administrative Office	122	1.0
Youth and Sports Organization	6	0.1
Ministry of Communications (Postal, Telephone, and Telegraph)	20	0.2
Administration for Scrap (Metals)	16	0.1
Main Administration for Power Production	106	0.9
Main Administration for Coal Production	344	2.8
Main Administration for Metals Production	477	3.9
Ministries for Construction of Machines and Electric Machines	2,412	19.9

* Footnotes for Table 3 follow on p. 13.

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Table 3

Allocation of Machine Tools in East Germany
1951 a/
(Continued)

<u>Receiver</u>	<u>Number of Machines (Units)</u>	<u>Percent</u>
Main Administration for Chemicals Production	89	0.7
Main Administration for Minerals and Ores	21	0.2
Ministry of Light Industry	188	1.6
Main Administration for Building	71	0.6
State Secretariat for Food and Luxuries	83	0.7
Ministry for the Agriculture and Forest Economy	468	3.8
Water Economy (Docks, Canals, etc.)	1	0.1
Ministry for Trade and Supply	7	0.1
State Secretariat for the Develop- ment of Agricultural Products	18	0.1
General Directorate for Railroads	262	2.1
General Directorate for Ship Transport	31	0.3
Office for Highways	14	0.1
Ministry of Health	49	0.4
Geological Commission	10	0.1
Total	<u>12,125</u> <u>b/</u>	<u>100.0</u>

a. See Appendix B, Methodology, p. 25.

b. Actual distribution reported at the end of the year based on incomplete returns from all producing firms. Total production in 1951 was 19,000 units. It is believed that the unreported units were distributed in approximately the same proportions as those indicated in Table 3. The discrepancy of exports of 2,967 (Table 3, above) with the estimated export of 3,500 units for 1951 as given in Table 2 is explained by the incompleteness of the data presented in Table 3. Table 3 is representative of the pattern of distribution of East German machine tool production rather than the distribution of total production.

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Exports are estimated to have increased as follows: 1,000 units in 1950, 3,500 units in 1951, 5,000 units in 1952, and 6,500 units in 1953. 28/ The original planned export goals on a value basis are to rise from 25 percent to approximately 65 percent in 1955. 29/ This goal represents an overly ambitious program and has recently been revised downward. This statement indicates the important position of machine tools in the East German economy.

East German exports of machine tools are handled by the organization known as DIAMASCH (Deutscher Innen- und Aussenhandel fuer Maschinen- und Metallwaren -- German trade agency for machinery and metal goods). 30/ This trade agency, concentrating mainly on machine tools and associated accessories and equipment such as chucks, and cutting tools, has been in control of internal and external trade for these commodities.

The distribution of East German machine tool exports within the Soviet Bloc is given in Table 4.

Table 4

Distribution of East German Machine Tools
to the Soviet Bloc
1953 a/ 31/

<u>Country</u>	<u>Percent of Total</u>
USSR	31.4
Albania	0.1
Bulgaria	0.5
China	19.4
Czechoslovakia	10.8
Hungary	8.5
North Korea	2.0
Poland	11.5
Rumania	15.8
Total	<u>100.0</u>

a. This table reports only the percentage distribution of East German machine tools within the Soviet Bloc. It is not possible to translate these percentages into units as exports to non-Bloc

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Table 4

Distribution of East German Machine Tools
to the Soviet Bloc
1953 a/
(Continued)

countries are not known. The estimated export figure of 6,500 units (see Table 2, p. 10) can be used as a maximum for estimating East German machine tools received by other members of the Bloc.

East Germany's machine tool exports are made up of nearly all machine tool types, but the priority machine types destined for export (particularly to the USSR) in 1952 and 1953 were jig borers, gear cutting machines, large horizontal boring and milling machines, large planers, heavy-duty vertical boring machines, heavy-duty high speed lathes, and vertical shapers (slotting machines). 32/ These machine types support a recent report that East Germany would be called upon to assist the USSR in its heavy machine tool production program. 33/

Increased shipments to Communist China, which is attempting to establish many new lines of industrial production, have become of major importance in spurring East German exports of machine tools.

East Germany has also attempted to sell in the Western markets of Europe, North, and South America and in addition, the Near East. Only isolated instances of East German sales are recorded so far in South America although there have been sale offers and large advertising programs. The Near East market, while not large, is probably considered a good place to dispose of less specialized types still in production, of which the Bloc has a surplus. To exhibit her industrial prowess East Germany has participated in a large number of industrial and trade fairs in the free market in the past 3 years. 34/

It is interesting to note that in early 1953 East Germany was attempting to sell machine tools in the US. 35/ The East Germans through US trade channels offered certain machine tools, mainly lathes and milling machines, to US importers. The East Germans negotiated through a Swiss company which claimed to have the North American trading franchise for all East German machines. After negotiation the US

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importer actually bought some units and advertised them in such trade journals as Iron Age and American Machinist. A large automotible producer, among others, bought two vertical turret lathes. Despite import duties and transportation costs the machines were cheaper than comparable US types. The East German machines fulfilled all advertised qualifications and have established a very good performance record in the production shops. 36/ It is not known whether additional sales are contemplated, but the increased availability of domestic machines will make it difficult for the East Germans to compete in the US market.

IV. Future Expansion.

In the immediate prewar period the German machine tool industry possessed excess capacity. Since World War II, however, the East German portion of the industry has had to undergo an almost complete reconstruction and has suffered harassment due to plan revisions, material shortages, and other problems common to the Soviet Bloc in the postwar period.

Despite these problems the East German machine tool industry has been welded into a strong producing unit which has been making an increasing contribution to the East German economy. Most of the early problems associated with the early postwar period have been solved. Currently, the East German machine tool industry is operating at near maximum capacity.

The present-day well-being of the industry is apparent. Channels of administration and distribution have become established and weaknesses rectified. In addition, there have been no apparent personality clashes. Politics on the industry level appear to be practically nonexistent. The administrative officials, managers, and other key production personnel have remained in the industry since the initial personnel losses in the prewar period. In addition, research and development have been stressed. Considerable time has been devoted at the industry level to design, training, and industrial planning.

Table 5* indicates that expansion of the industry was greatest in the second and third years of the Plan. Production is expected to increase at a good rate through the latter years of the Plan, although the exceptional growth evidenced in 1952 and 1953 will not be maintained. It is probable that production will become stabilized by 1957-58.

* Table 5 follows on p. 17.

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Table 5

Index of Machine Tool Production in East Germany
1951-58 a/

<u>Year</u>	<u>Production (Units)</u>	<u>Index (1951 = 100)</u>	<u>Percentage Increase</u>
1951	19,000	100	
1952	24,000	126	26.3
1953	26,000	137	8.3
1954	28,000	147	7.7
1955	30,000	158	7.1
1956	32,000	168	6.7
1957	34,000	179	6.3
1958	35,000	184	2.9

a. Adapted from Table 1, p. 8, above.

The conclusion that production will become stabilized before 1958 is supported by recent activities in the machine tool industry. Available evidence indicates that increased production has been achieved by expanding existing facilities, increasing labor productivity, and by establishing short-term training programs to increase the supply of skilled labor within the current Five Year Plan (1951-55).

Expansion of facilities for increased machine tool production has been confined to the expansion of existing machine tool plants. Since the initial reconstruction period, 1946-50, there have been only two reported formations of new machine tool firms. The last major unit to be set up was the "Modul" Gear Cutting Machine Factory in Karl-Marx-Stadt (formerly Chemnitz). Even this plant was not a completely new installation. "Modul" is the site of the old Pfauter Works. The Pfauter family and many of the top personnel fled to the western zones of Germany in 1945-46 and re-established their plant in Ludwigsburg. 37/

The expansion that is going on at present is confined largely to the "Schwerpunkt," or key plants. These major units are now expanding their existing facilities to relieve crowded conditions in various departments. Information on new construction is included in Appendix A.

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S-E-C-R-E-TV. Inputs.

The calculation of input requirements for East Germany's machine tool industry is based mainly on US relationships. Comparison of US and German practice (before 1945) indicates that the estimated inputs given in Table 6 have a fair degree of reliability.

Table 6

Estimated Input Requirements for the Machine Tool Industry
in East Germany a/
1954

<u>Item</u>	<u>Units</u>	<u>Machine Tool Industry Requirements</u>	<u>Total East German Production <u>b/</u></u>
Steel (All Shapes)	Metric Tons	30,300	2,000,000
Iron Castings	Metric Tons	64,000	N.A.
Copper	Metric Tons	480	60,000
Aluminum	Metric Tons	290	35,000
Rubber	Metric Tons	180	66,000 <u>c/</u>
Lumber	Metric Tons	3,400	N.A.
Preservatives	Metric Tons	40	N.A.
Paint	Liters	60,000	73,000,000
Bearings (Antifriction)	Thousands	640	N.A.
Motors (Total Ratings)	Kilowatts	164,000	N.A.
Electrical Energy	Million Kilowatt- Hours	140	28,000 <u>d/</u>
Coal	Metric Tons	116,000	188,396,000 <u>e/</u>
Labor	Employees	22,000 to 25,000	N.A.

a. See Appendix B, Methodology, p. 25.

b. East German practice includes production as one segment of planned supply and distribution. The items under total production for East Germany include imports, production, and other supplies.

c. Planned synthetic rubber production.

d. May not include production of plants at the locally controlled level.

e. Includes 180 million metric tons of brown coal, 3,200,000 metric tons of hard coal, and imports of 5,196,000 metric tons of hard coal.

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Two of the most important inputs into machine tool production are machine tools themselves and plant facilities. The inventory of the East German machine tool industry is not known. Based upon analogous US relationships, however, it is estimated at approximately 7,800 units.*

Iron and steel for the estimated level of 1954-58 production will probably be available. Steel and iron supplies have been adequate to meet past production schedules and no difficulty is anticipated.

During the past three years there have been numerous reported shortages of copper and aluminum in the machine tool industry. Rather than actual shortages, however, it appears that there has been faulty allocation and distribution of copper and aluminum by the Material Supply Section of the Main Administration for Heavy Machine Building. 38/ This is surprising in view of the industry's position as a high-priority industry. Despite these past shortages it is believed that future needs will be met.

Because of the small amounts of other raw materials (rubber, lumber-preservatives, and paint) it is estimated that requirements for these items will be filled.

Previously bearings had been considered a bottle-neck item in the machine tool industry. 39/ The bearings industry is, however, presently a part of the machine tool industry and because of the recent expansion in bearings production it is believed that bearings will be in adequate supply for the machine tool industry's planned expansion.

No shortages of electric motors have been reported to date. The supply is estimated to be adequate to meet production schedules.

Both electric power and coal production are estimated to be adequate to meet expansion goals.

There have been many reports of labor shortages throughout East Germany, and shortages of skilled labor have been occasionally reported in the machine tool industry. 40/ It is estimated, however, that labor

* The inventory of machine tools in the East German machine tool industry is based upon an estimated three workers for each installed machine tool. This relationship is based upon a sample of the US machine tool industry.

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will be adequate to meet the production scheduled for 1954-58. The large number of schools that have been opened for each industry ^{41/} indicates that skilled labor will not be a problem. In addition, the machine tool industry has a relatively large apprentice program within its own organization. Other classes of labor are adequate for machine tool production.

VI. Capabilities, Vulnerabilities, and Intentions.

A. Capabilities.

The East German machine tool industry is well integrated and is capable of fulfilling its role as a major contributor to East Germany's industrial growth. In addition, the industry is a significant contributor of machine tools to other members of the Soviet Bloc.

With serious problems facing it in 1945-48 the industry began to produce sturdy, well built machine tools and at the present time has overcome nearly all the early problems associated with war damage, reparations, manpower losses, and raw material shortages.

The industry is capable of expanding production beyond its present level but probably will not undergo a major expansion, because at the present time the industry is filling domestic needs and has excess production for which markets are being sought.

B. Vulnerabilities.

The machine tool industry is vulnerable to stoppages of raw materials, loss of key workers, or malfunctioning of the planning system.

The industry, however, is dispersed and has the ability to recuperate rapidly, as the postwar period has shown. During World War II, air attacks had their greatest effect when they struck at the input and output distribution centers. ^{42/} The only method of completely eliminating plants and their production during World War II was through actual military occupation.

C. Intentions.

The demand for machine tools in East Germany presumably will grow in the future on the reported resumption of aircraft production. ^{43/} US experience indicates that the aircraft industry consumes a sizable

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percentage of total machine tool production. 44/ Thus the growth of an aircraft industry in East Germany would create a large new market. It is possible that if the proposed East German production of aircraft is great enough, this production will be reflected in a continued high-priority position for the machine tool industry and will in addition absorb many of the machine tools now supposedly destined for new export markets.

Present indications, aside from the newly reported aircraft production plan, are that the machine tool industry is filling the typical peacetime role of supplying both East German industry and the industries of the Soviet Bloc. Production of the East German machine tool industry does not reflect a change in demand other than the estimated normal change in all machine tool industries the world over -- a trend to heavier, more specialized types, with greater automation. The East German industry in June 1954 is a negative indicator of Bloc intentions.

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APPENDIX A

MAJOR EAST GERMAN MACHINE TOOL PLANTS

Plant Name	Location <u>a</u> / [*]	Products	Production <u>b</u> / (Units)	Remarks
1. VEB Grossdrehmaschinenbau "7 Oktober" <u>45/</u>	Gehringstrasse 39, Berlin-Weissensee	Single and double column vertical boring mills; gear-tooth grinding machines; radial drill presses; and special machines as ordered.	2,000	Key plant. Ex-Niles Works. Labor 2,000. Plant was damaged and dismantled (80 per cent) in World War II. Important shipments made to the USSR. Four new work halls completed in 1953. Large boring mill production to be increased from 350 units in 1951 to 165 in 1955.
2. VEB Grossdrehmaschinenbau "8 Mai"	Otto-Schmerbach- Strasse, Karl-Marx- Stadt (Chemnitz)	Heavy duty lathes; vertical boring mills; drum (Pittler) turret lathes; horizontal boring mills; clear-cutting machines; milling machines.	3,000	Key plant. Ex-Niles Works. Largest producer unitwise in Eastern Germany. 2,000 workers. New (1952) work hall being erected.
3. VEB Werkzeugmaschinen- fabrik Aschersleben (WEMA) <u>46/</u> Werk I	Magdeburger Strasse, Aschersleben	Large planing machines; surface grinders; circular grinders.	800	Key plant. Ex-Billeter and Klunz. Leading producer of large planers. Firm includes three different works--all located in Aschersleben. Werk I is the main office. Labor, 700 workers.
Werk II	Heinrichstrasse, Aschersleben	Carriages for grinding machines; feeding gear mechanisms; assembly of motors for Werke I and II; parts for planers; apprentice program.	N.A.	Ex-Gerson Light Machine Factory. Main function is the production of parts for Werk I and II. 200 workers.
Werk III	Wilsleben Strasse, Aschersleben	Parallel planers (double column); 3 sizes of "small" planers; press for gun cartridge shells; grinders.	200	Ex-Junkers plant. This plant is nearing the end of a new building program expected to double production. Workers of all plants participated in 17 June 1953 riots. 300 workers.

* Footnotes follow on p. 24.

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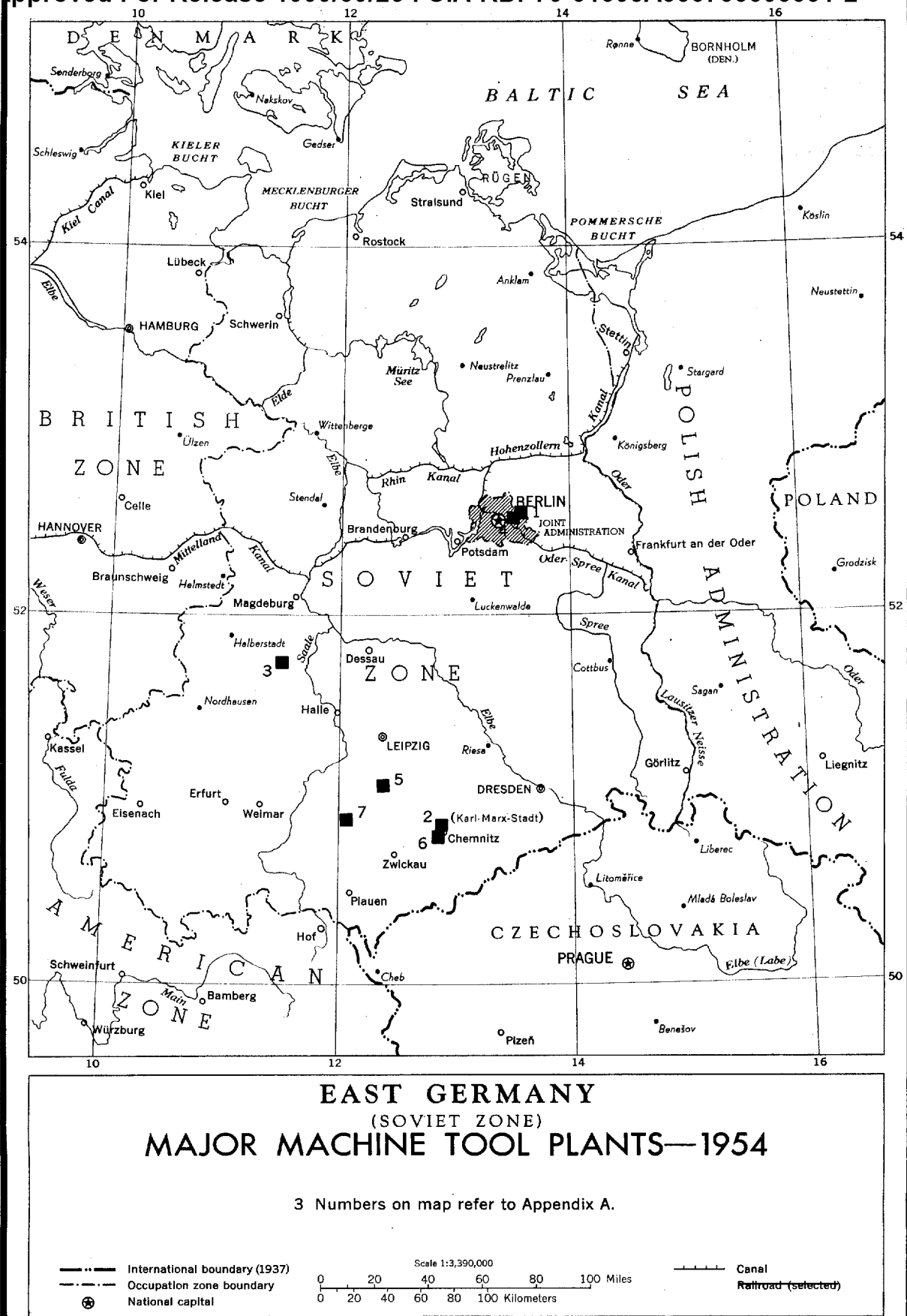
Plant Name	Location ^{a/}	Products	Production b/ (Units)	Remarks
VEB Berliner Werkzeugmaschinenfabrik Werk I 47/	Krautstrasse 52, Berlin O 17.	Engine lathes; automatic multi-spindle lathes; radial drills; turret lathes	1,000	Key plant. Ex-Kaerger. 1,000 workers. With Werk II in Marzahn it is the second largest installation in East Berlin. Workers rioted on 17 June 1953. Possible third installation being set up at Strassberger Platz.
Werk II	Berliner Strasse, Berlin-Marzahn	Engine lathes; automatic lathes; turret lathes	700	Ex-Hasse und Wrede and Berlin Drehautomaten Werk. Subordinate to Werk I. 600 workers.
VEB Maschinenfabrik "John Scheer" Werk I 48/	Heymer-Pilz Strasse, Meuselwitz/Thuringen	Slotting machines; roll-turning lathes; heavy-duty engine lathes; some general machine building.	400	Key plant. Firm has at least three small subordinate works, details unavailable. One of the leading producers in the heavy machine program. 1,000 workers.
VEB Zahnschneide- maschinenfabrik "Modul" 49/	Einsiedeler Strasse, Karl-Marx-Stadt (Chemnitz)	Gear-cutting and milling machines, slotting-hobbing-bevel gear and other types; other machine types probably include small planers; pumps.	1,600	Ex-Herman Pfauter Works. 1,500 workers. Five Year Plan includes construction of six new "work halls" which will treble the plant area. No. 1 firm engaged in gear machine building.
VEB Werkzeugmaschinenfabrik "Union" 50/	Tschaikowskistrasse, Gera.	Horizontal boring and milling machines, all sizes; radial drills.	800	Ex-Karl Wetzel Factory. Termed a key plant under the priority program in 1950, but since removed from that status. Has a large foundry located north of Gera that serves other plants in addition to the machine tool assembly shop. World War II damage 90 percent. Mostly rebuilt now. Some new construction outlined for 1954. 800 workers.

See the map following p. 24.

Units of production and labor estimated as the rate on 1 January 1954.

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APPENDIX B

METHODOLOGY

Basically the production, inventory, distribution, and plant estimates in this report were derived by a combination of individual plant studies, over-all reported statistics, interpolation, and extrapolation.

1. Production Estimates.

Production estimates were based on two types of information. First the reported production of machine tools in the 1939-44 period was obtained from a study of the German machine tool industry made immediately at the close of World War II by personnel from both industry and the US Armed Forces under the sponsorship of the Air Force. This study proved to be the most important single source for that period. It also gave a firm base for postwar estimates and assumptions. The 1945 period remains an unknown quantity in the whole picture because of the chaos in the industry caused by the German defeat. Undoubtedly, there was some production in the first few months in at least a number of the plants, but there is no available information on the subject.

Beginning in 1946 production estimates are carried through to the end of the Five Year Plan (1955) and projected into the post-Plan period of 1956-58. The estimates in the 1946-55 period were tabulated year by year and were considered for their compatibility with the announced plans and/or fulfillments where such information was known. Firm figures were unavailable in most cases, but a complete record of production was obtained for 1951, which permitted an accurate midpoint to be used for interpolating to the end of the plan period. The estimates are believed to be correct within a range of 10 percent from 1952 to 1955. Plan figures were available in value (Deutsche Mark, East) for nearly every year, but these value figures contained other products produced by the main administration in charge of machine tool production. It was necessary to separate these value figures and arrive at a unit value figure for metal-cutting machines. This was done and it provided a check on the estimates from other sources.

The production in the postwar period was broken down into eight categories* to conform to the customary German method of presenting

* See p. 2, above.

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machine tool statistics. This method parallels the prewar breakdown. The 1951 production figures are used to determine the percentage of each type produced since 1951. The estimates for turret lathes and automatics show, when carried through each succeeding year, that this category was not advancing as rapidly as value figures for this category would indicate.

2. Distribution.

The planned distribution of machine tools for the year 1951 is given in Table 3 and was used despite the fact that it did not contain a full distribution of that year's production. In some cases the original report listed extra deliveries of one particular type to a receiving industry or administrative unit. These extra allocations would bring the total represented in the Table up to the actual production figure reported.

3. Inventory.

The inventory estimates for 1945 are the result of deducting known losses of machine tools from East Germany's World War II holdings (680,000 units, estimated). These losses include war damages, Polish removals, and Soviet removals. Annual estimated production and estimated imports were added to this figure. Estimated exports, estimated reparations, and estimated retirement were deducted.

The production estimates are covered above. Imports were estimated at the rate of 100 units annually throughout the current plan period as various intelligence reports mentioned this figure and others in close range. It is evident that imports did not exceed 100 units for any one year since 1950.

Exports were estimated from a few reports which did not give complete coverage (except for 1951) for all of the models produced and presumably exported. The figure for 1951 is estimated to have a margin of error of less than 10 percent.

Reparations estimates were obtained from a single source and appear to be confirmed by other reports. The good report on 1951 (see above) reports 166 units actually delivered with other units presumably to be allocated but not yet reported to the ministry.

East German imports are extremely small. East German reparations to the USSR have also been quantitatively small. These imports

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and reparations, however, are estimated to be extremely costly and are far more important than the absolute quantities involved would imply.

The retirement rate is estimated to rise at the rate of 1 percent in 1946 and 1947 and an additional 1 percent in each succeeding 2-year period. This brings 1952 and 1953 retirement to 4 percent for each year. The rate was estimated to cover 1954 and 1955 when it will presumably be 5 percent, but no confirming data are available. It is doubtful that many, if any, machines were being retired in the immediate postwar period when East Germany was beginning its postwar recovery. It is evident that East Germany probably fixed a rate or policy of retirement after the machine tool industry resumed full-scale production. Because of German prewar policy of long use of machines, it is probable that the retirement rate will not exceed 5 percent.

4. Input Requirements.

To arrive at the material input requirements of the East German machine tool industry it was necessary to determine first of all the average weight per machine tool unit. This was determined by taking the average weight per machine tool produced in the years 1939-44. This weight was found to rise from 1.44 metric tons per unit in 1939 to 2.16 metric tons per unit in 1944. 51/ The rise in weight was calculated at .72 metric tons through the 5-year period, or an increase of .14 metric tons per year. Here the assumption was made, because of the break in production in East Germany in 1945 and the slow beginning of the industry again in 1946, that machine tool design did not change and that the 1948 weight was the same as the 1944 weight (2.16 metric tons). Beginning in 1948 the increase, as seen in the immediate prewar period, was again resumed, and the 1954 estimated weight per machine tool unit was 3.0 metric tons.

To find the proportion of the various metals entering into the manufacture of machine tools in the US, the weights of the metals given in the 1947 US Census of Manufactures were expressed as percentages of total weights as shown below:

	<u>Short Tons</u>	<u>Percent</u>
Steel, All Shapes	61,995	31.8
Iron Castings	130,964	67.4
Copper and Alloys	921	.5
Aluminum and Alloys	609	.3
Total	<u>194,489</u>	<u>100.0</u>

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The weight of such items as are made by other segments of industry, that is, motors, antifriction bearings, rubber and paint, was deducted from the weight of the finished and equipped machine tool. The total weight of these items was estimated to be 350 pounds per unit. Deducting this from the finished and equipped unit of 6,614 pounds (3 metric tons) leaves 6,264 pounds as the weight of the finished unit produced by the East German machine tool plants. However, data gathered from US machine tool manufacturers reveal that there is a 20-percent loss in producing the finished unit from the raw metals. 52/ On this basis an East German machine tool requires 6,264 plus 1,250 pounds, or 7,514 pounds. This figure when multiplied by the 1954 production figure (28,000) and converted to tons gives the metal requirements as 95,000 metric tons. This metal input total was then multiplied by the percentages established for each metal, and the results are the tonnage input requirement for each type of metal.

V-belts for drives, oil wipers, seals, and other rubber products used in machine tool production are estimated to weigh 14 pounds per unit. The annual production, multiplied by 14, converted to metric tons totals 180 metric tons.

The East Germans were estimated to prepare their product for shipment equally as well as US industry does. Therefore, the requirement in lumber for skids, crates, bracing, packing boxes, and excelsior was estimated to be 4 percent of the weight of the finished and equipped machine tool. The finished equipped weight is 84,000 metric tons and 4 percent of this is 3,400 metric tons.

It is estimated that 3 pounds of preservative are used to protect each unit while it is in transit. Three times 28,000 gives 84,000 pounds, or 40 metric tons, of preservative.

The motor power rating for each unit was estimated as 5.86 kilowatts (kw) (7.85 hp) per unit. The 28,000 machine tool units produced multiplied by 5.86 kw equals 164,080 kw.

It is assumed that East German power requirements bear the same relationship to US requirements as East German metal inputs do to US metal inputs. Thus the US metal inputs of 194,449 short tons in 1947 required a total energy input of 257 million kilowatt-hours. 53/ Converted to metric tons, the 194,449 short tons become 176,404 metric tons. Therefore, the US 1947 requirement was 1,457 kilowatt-hours per metric ton of metal input. East German metal inputs of 95,344 metric tons multiplied by 1,457 give 140 million kilowatt-hours.

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The average machine tool is estimated to have a combined internal and external surface of 100 square feet which requires painting or sealing. The average weight per gallon of paint (enamel) is 8 pounds, and its coverage is 400 square feet. The average unit requires at least one coat each of sealer, primer (or filler), and enamel, totaling 225 square feet of area requiring 4.5 pounds, or .562 gallons, of paint per unit. The gallons multiplied by the 28,000 units total 15,736 gallons of paint. Converting this to the metric system ($15,736 \times 3.785 = 59,561$) gives 59,561 liters as the paint input.

Twenty-three antifriction bearings are estimated as the requirement for the average East German machine tool unit. Twenty-three multiplied by the 28,000 units equals 644,000 ($28,000 \times 23 = 644,000$). The type of bearings used are ball, roller, and thrust. 54/

It is assumed that coal requirements are proportional to weight of metal inputs. US fuel requirements for the machine tool industry are given in several categories, that is, coal, coke, fuel oil, and gas. 55/ There is substitutability between these fuels. Since information on their proportional use in East Germany is lacking, estimates were converted to coal, which is probably the standard fuel for this industry in East Germany. The US 1947 fuel requirements are equivalent to 5,950 billion Btu. Each metric ton of metal consumed by the US machine tool industry required 33.7 million Btu ($5,950 \text{ billion Btu's} \div 176,404 \text{ metric tons} = 33,729,393$). There are 27.8 million Btu's in a metric ton of coal. 56/ Each metric ton of metal requires 1.216 metric tons of coal ($33.7 \text{ million} \div 27.8 \text{ million} = 1.21$). The 95,344 metric tons of metals consumed multiplied by 1.21 equals 115,366 metric tons of coal required by the East German machine tool industry.

It is difficult to estimate the number of workers employed in the East German machine tool industry allocated to the machine tool production covered in this report because metal-forming machines are included in the industry. Another complication is that this industry, under the WMW symbol, also produces bearings. The labor force engaged in machine tool production is estimated as follows. Germany in 1944 produced 79,348 units of machine tools. 57/ The labor figure for this year was 86,800 workers, but this total included workers employed in the production of other types (metal-forming). The total production of all types (including metal-cutting and forming) was 110,377 units. The machine tool types covered in this report accounted for 72 percent of the total on a unit basis. It was assumed that equal numbers of workers would be employed on all types. Thus 72 percent of the total labor

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figure was 62,400 workers. The actual number of units produced was divided by this calculated figure and the result was a productivity rating of 1.3 units of machine tools produced by each worker. This productivity rating applied to the 1954 East German production of 28,000 machine tools gives an estimated minimum labor input figure of 22,000 workers.

It is entirely possible that the labor figure calculated above is too low. It imputes a rather high productivity rating to the East German industry. By way of contrast US industry had a rating average of 1.1 units per year per worker in 1946-50. Despite the fact that the East German worker is probably less productive, the East German machine tool industry is estimated to be on a 48-hour week (in certain plants longer), and thus it is not impossible that the US and East German worker could be estimated to be nearly equal in productivity. A range of 22,000 to 25,000 workers is given in Table 6. Estimates have been as high as 31,000 workers 58/, including all of the WMW (Werkzeugmaschinen und Werkzeug).

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APPENDIX C

GAPS IN INTELLIGENCE

1. History, Technology, and Organization.

The exact role played by the SAG in the production of machine tools from 1946 to 1954 is not clear. The tendency to classify different SAG's by only a general title, such as "heavy machinery," helped to hide the activities of the corporation. It is known that the work of certain SAG's was oriented strongly to the research and development phase.

2. Supply.

Production plans and results for all of the models of machine tools produced in East Germany are not available. In the period immediately preceding a plan period, the East German State Planning Commission releases a detailed list of the commodities and their serial numbers. It is obvious from many of the reports received on the actual amounts planned or produced that in a sector such as machine tools the collector obtains information for only a portion of a class of tools (for example, engine lathes) while neglecting other types either through lack of knowledge of the commodity or lack of opportunity to obtain the complete statistics. Many times the production of one particular model is represented as the production for the class. There is a similar gap as to the role that plants normally associated with other industries play in producing machine tools. At least three other "Main Administrations" are known to have a part in the production of machine tools.

3. Demand.

A large gap exists in the use pattern concept. In the present case it was possible to construct a use pattern for one year due to the acquisition of a valuable summary document. For all other years such information is either not available or is so fragmentary that it must of necessity be worked upon by all of the receiver industries. This gap also ties in with the "Inputs" section. Machine tools are an input into all productive processes, but at present it is not possible to call upon other offices in the intelligence field to furnish such information.

The problem can be solved in either of two ways: by collecting detailed summary reports on all phases of every industry, or by

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further emphasizing the inputs section of all reports so that every report contains information on all inputs. US practice is good when applied to the specific makeup of material and energy inputs from country to country, but it cannot show the use pattern of other countries.

Trade, under both imports and exports, needs greater coverage. The whole reparations program (direct and indirect) plus the method that is used to fit the Soviet Bloc into an interrelated market has probably been the chief problem in research on East German trade. Recommendations for filling this gap center mainly on more intensive collection of summary types of material. The procurement of information on individual shipments provides the analyst with valuable information (indicators) as to priority types, but the compilation of a year's or decade's trade obviously requires information on the whole picture. The many fragments in most cases cannot be pieced together for this type of report.

4. Future Industry Expansion.

While most of this category is centered on estimates of the future of the industry, this section could be made more firm by reports dealing with research and development of both the product and the industry. Such reports undoubtedly exist in East Germany and throughout the Soviet Bloc.

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APPENDIX D

SOURCES AND EVALUATION OF SOURCES

1. Evaluation of Sources.

This report was written largely from CIA, Army, and Air Force documents. Prewar information was obtained from a high-quality report written for the "United States Strategic Bombing Survey." Generally, the reports used are of good quality, though the range in evaluations is wide.

2. Sources.

Evaluations, following the classification entry and designated "Eval.," have the following significance:

<u>Source of Information</u>	<u>Information</u>
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

"Documentary" refers to original documents of foreign governments and organizations; copies or translations of such documents by a staff officer; or information extracted from such documents by a staff officer, all of which may carry the field evaluation "Documentary."

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this report. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

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